



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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RENEWAL OF APPROVAL FOR REMEDIAL USE

Pursuant to Title, 310 CMR 15.00

Name and Address of Applicant:

F.R. Mahony & Associates, Inc.
273 Weymouth Street
Rockland, MA 02370

Trade name of technology and model: Amphidrome Wastewater Treatment Process (hereinafter the "System"). Schematic drawings illustrating the models and an Inspection checklist are part of this certification.

Transmittal Number: W 063566
Renewal Date: September 19, 2005

Authority for Issuance

Pursuant to Title 5 of the State Environmental Code, 310 CMR 15.000, the Department of Environmental Protection hereby issues this Approval for Remedial Use to: Use to F.R. Mahony & Associates, Inc., 273 Weymouth Street, Rockland, MA 02370 (hereinafter "the Company"), approving the System described herein for Remedial Use in the Commonwealth of Massachusetts. Sale and use of the System are conditioned on compliance by the Company and the System owner with the terms and conditions set forth below. Any noncompliance with the terms or conditions of this Approval constitutes a violation of 310 CMR 15.000.

Glenn Haas, Director
Division of Watershed Management
Department of Environmental Protection

September 19, 2005
Date

I. Purpose

1. The purpose of this approval is to allow use of the System in Massachusetts, on a Remedial Use basis.
2. With the necessary permits and approvals required by 310 CMR 15.000, this Approval for Remedial Use authorizes the use and installation of the System in Massachusetts.
3. The System may only be installed on facilities that meet the criteria of 310 CMR 15.284(2).
4. This Approval for Remedial Use authorizes the use of the System where the local approving authority finds that the System is for upgrade of a failed, failing or nonconforming system and the design flow for the facility is less than 10,000 gallons per day (GPD).

II. Design Standards

1. The System is a biological wastewater treatment system that utilizes a Submerged Attached-Growth Sequencing Bioreactor (SAGSB). The System consists of an anoxic/equalization tank, which must comply with the design criteria set forth below, a single reactor that alternates between aerobic and anaerobic conditions, and a clear well. Wastewater passes from the anoxic/equalization tank, through a granular biological filter and into the clear well. A pump is then used to reverse the flow back to the anoxic/equalization tank. This cycle is repeated multiple times and the effluent is discharged to the soil absorption system. A schematic of the System is attached to and is part of this Approval.
 - i. The anoxic/equalization tank shall be designed to have a total working volume equal to one day's design flow plus the volume of one backwash.
 - ii. The residual volume (i.e. volume below the effluent invert) shall equal one day's design flow.
 - iii. The height of the invert of the effluent pipe from the bottom of tank shall be at least 4 ft.
 - iv. The bottom of the effluent tee in the anoxic tank shall not be more than 1 ft. below the effluent invert.
 - v. The volume between the influent invert and the effluent invert (i.e. fluctuating volume) must be equal to the volume required for one backwash.
 - vi. The influent invert shall be placed as close to the top of the tank as possible.
 - vii. The influent and effluent tees shall be located under the access lids or manholes, and positioned at opposite ends of the tank.
 - viii. The riser of the tee shall come up into the riser of the tank to ensure that it is above the high water level.

- ix. A minimum of a 1500 gallon anoxic/equalization tank is required.
 - x. The requirements in 310 CMR 15.223(1) and 310 CMR 15.224 do not apply to the System.
- 2. The System shall be installed in series between the anoxic equalization tank and the soil absorption system of a standard Title 5 system constructed in accordance with 310 CMR 15.100 - 15.279, subject to the provisions of this Approval.
- 3. All access ports and manhole covers shall be installed and maintained at grade to allow for maintenance of the System
- 4. The control panel including alarms and controls shall be mounted in a location accessible to the System operator.
- 5. The System may be used in soils with a percolation rate of up to 90 minutes per inch (MPI). For soils with a percolation rate of 60 to 90 MPI, the effluent loading rate shall be 0.15 gpd / sq.ft or less.

III. Allowable Soil Absorption System Design

- 1. Reduction of the Required Soil Absorption System Size - In approving design and installation of the System by a particular Applicant, the approving authority may allow up to a 50 percent reduction in the area of the soil absorption system required by 310 CMR 15.242, provided that all of the following conditions are met:
 - A. No reduction in the required separation (four feet in soils with a recorded percolation rate of more than two minutes per inch or five feet in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the stone underlying the SAS and the high groundwater elevation is allowed unless such a reduction is approved by the approving authority and then approved by the Department pursuant to 310 CMR 15.284.
 - B. No reduction in the required four feet of naturally occurring pervious material is allowed unless the Applicant has demonstrated that the four foot requirement cannot be met anywhere on the site; that easements to adjacent property on which a system in compliance with the four foot requirement could be installed have been requested but cannot be obtained; and that a shared system is not feasible. Any such reduction must be approved by the approving authority and then approved by the Department pursuant to 310 CMR 15.284.
 - C. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, the approving authority may allow a reduction under a local upgrade approval in accordance with 310 CMR 15.405 (1) (a), (b), (f), (g), and (h).

- D. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, even taking into account provisions for local upgrade approval as described above, then pursuant to 310 CMR 15.410, the applicant must obtain variance(s) from the approving authority and then approved by the Department.
- 2. Reduction of the Required Separation Distance to High Groundwater Elevation – In approving design and installation of the System by a particular Applicant, the approving authority may allow a reduction in the required separation between the bottom of the stone underlying the SAS and the high groundwater elevation, provided that all of the following conditions are met:
 - A. A minimum two-foot separation (in soils with a recorded percolation rate of more than two minutes per inch) or a minimum three-foot separation (in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the stone underlying the SAS and the high groundwater elevation is maintained.
 - B. No reduction in the required SAS size is allowed unless such a reduction is approved by the approving authority and then approved by the Department pursuant to 310 CMR 15.284.
 - C. No reduction in the required four feet of naturally occurring pervious material is allowed unless the Applicant has demonstrated that the four foot requirement cannot be met anywhere on the site; that easements to adjacent property on which a system in compliance with the four foot requirement could be installed have been requested but cannot be obtained; and that a shared system is not feasible. Any such reduction must be approved by the approving authority and then approved by the Department pursuant to 310 CMR 15.284.
 - D. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, the approving authority may allow a reduction under a local upgrade approval in accordance with 310 CMR 15.405 (1) (a), (b), (f), (g), and (h).
 - E. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, even taking into account provisions for local upgrade approval as described above, then pursuant to 310 CMR 15.410, the applicant must obtain variance(s) from the approving authority and then approved by the Department.
- 3. Reduction of the Requirement for Four Feet of Naturally Occurring Pervious Material –In approving design and installation of the System by a particular Applicant, the approving authority may allow a reduction in the required four feet of naturally occurring pervious material in an area with no less than two feet of naturally occurring pervious material, provided that all of the following conditions are met:
 - A. The Applicant has demonstrated that the four foot requirement cannot be met anywhere on the site; and that easements to adjacent property on which a system in

compliance with the four foot requirement could be installed have been requested but cannot be obtained; and that a shared system is not feasible.

- B. No reduction in the required SAS size is allowed unless such a reduction is first approved by the approving authority and then approved by the Department pursuant to 310 CMR 15.284.
- C. No reduction in the required separation (four feet in soils with a recorded percolation rate of more than two minutes per inch or five feet in soils with a recorded percolation rate of two minutes or less per inch) between the bottom of the stone underlying the SAS and the high groundwater elevation is allowed unless such a reduction is first approved by the approving authority and then approved by the Department pursuant to 310 CMR 15.284.
- D. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, the approving authority may allow a reduction under a local upgrade approval in accordance with 310 CMR 15.405 (1) (a), (b), (f), (g), and (h).
- E. Where full compliance with all of the minimum set back distances in 310 CMR 15.211 is not feasible, even taking into account provisions for local upgrade approval as described above, then pursuant to 310 CMR 15.410, the applicant must obtain variance(s) from the approving authority and then approved by the Department.

IV. General Conditions

- 1. All provisions of 310 CMR 15.000 are applicable to the use of this System, the System owner and the Company, except those that specifically have been varied by the terms of this Approval.
- 2. Any required operation and maintenance, monitoring and testing shall be performed in accordance with a Department approved plan. Any required sample analysis shall be conducted by an independent U.S. EPA or DEP approved testing laboratory. It shall be a violation of this Approval to falsify any data collected pursuant to an approved testing plan, to omit any required data or to fail to submit any report required by such plan.
- 3. The facility served by the System, and the System itself, shall be open to inspection and sampling by the Department and the local approving authority at all reasonable times.
- 4. In accordance with applicable law, the Department or the local approving authority may require the owner of the System to cease operation of the system and/or to take any other action as it deems necessary to protect public health, safety, welfare and the environment.
- 5. The Department has not determined that the performance of the System will provide a level of protection to public health and safety and the environment that is at least equivalent to that of a sewer system. Accordingly, no System shall be installed, upgraded

or expanded, if it is feasible to connect the facility to a sanitary sewer, unless as allowed by 310 CMR 15.004. When a sanitary sewer connection becomes feasible, the facility served by the System shall be connected to the sewer, within 60 days of such feasibility, and the System shall be abandoned in compliance with 310 CMR 15.354, unless a later time is allowed, in writing, by the approving authority.

6. Design, installation and operation of the System shall be in strict conformance with the Company's DEP approved plans and specifications and 310 CMR 15.000, subject to this Approval.
7. Pressure distribution designed in accordance with Department guidance is required for all installations of the System.

V. Conditions Applicable to the System Owner

1. The System is approved only in connection with the treatment and disposal of the discharge of sanitary wastewater. Any non-sanitary wastewater generated or used at the facility served by the System shall not be introduced into the System and shall be lawfully disposed of.
2. Effluent discharge concentrations shall meet or exceed secondary treatment standards of 30 mg/L biochemical oxygen demand (BOD₅) and 30 mg/L total suspended solids (TSS). The effluent pH shall not be less than 6.0 or more than 9.0.
3. All samples shall be taken at a flowing discharge point, i.e. distribution box, pipe entering a pump chamber or other Department approved location from the treatment unit. Any required influent sample shall be taken at a point that will provide a representative sample of the influent. Influent sampling locations shall be determined by the system designer, subject to written approval by the Department
4. Operation and Maintenance Agreement:
 - A. Throughout its life, the System shall be under an operation and maintenance (O&M) agreement. No O&M agreement shall be for less than one year.
 - B. No System shall be used until an O&M agreement is submitted to the approving authority which:
 - i. Provides for the contracting of a person or firm trained by the Company as provided in Section VI (6) and competent in providing services consistent with the System's specifications, with the operation and maintenance requirements specified by the Company and the designer, and with any specified by the Department;

- ii. Contains procedures for notification to the Department and the local approving authority within five days of knowledge of a System failure, malfunction or alarm event and for corrective measures to be taken immediately;
 - iii. Provides the name of an operator, which must be a Massachusetts certified operator as required by 257 CMR 2.00 of an appropriate grade that will operate and monitor the System. The operator must operate and maintain the System in accordance with the Department's policy or at least every three months and anytime there is an alarm event.
- 5. The System owner shall at all times have the System properly operated and maintained in accordance with this Approval, the designer's operation and maintenance requirements and the Company's approved procedures and sampling protocols. The System owner shall notify the Department and the local approving authority in writing within seven days of a change in the operator.
- 6. The System owner shall provide a copy of this Approval, prior to signing of a purchase and sales agreement for the facility served by the System or any portion thereof, to the proposed owner. Any and all instruments of transfer and any leases or rental agreements shall include as an exhibit attached thereto and made a part thereof a copy of this Approval for the System. The System owner shall send a copy of such written notification(s) to the local approving authority within 10 days of such notice being given.
- 7. Effluent from the System serving a facility shall be monitored in accordance with Department policy or at a minimum for the following parameters: pH, BOD₅, and TSS. After one year of monitoring and reporting and at the written request of the System owner, the Department may reduce the monitoring and reporting requirements.
- 8. By January 31st of each year, the System owner shall submit to the Department and the local approving authority all data collected in accordance with item 7, above, and an O&M and a technology checklist, completed by the System operator for each inspection performed during the previous 12 months.
- 9. Prior to the issuance of a Certificate of Compliance for the System, the System owner shall record and/or register in the appropriate Registry of Deeds and/or Land Registration Office, a Notice disclosing both the existence of the alternative septic system subject to this Approval on the property and the Department's approval of the System. If the property subject to the Notice is unregistered land, the Notice shall be marginally referenced on the owner's deed to the property. Within 30 days of recording and/or registering the Notice, the System owner shall submit the following to the Department and the local approving authority: (i) a certified Registry copy of the Notice bearing the book and page/instrument number and/or document number; and (ii) if the property is unregistered land, a Registry copy of the owner's deed to the property, bearing the marginal reference.

VI. Conditions Applicable to the Company

1. By January 31st of each year, the Company shall submit a report to the Department a report signed by a corporate officer, general partner, or Company owner that contains information on the System for the previous calendar year. The report shall state: the number of units of the System sold for use in Massachusetts during the previous year, including the installation date and date of start-up during the previous year; the address of each installed System, the owner's name and address, the type of use (e.g. residential, commercial, school, institutional) and the design flow; and for all Systems installed since the date of issuance of this Approval, all known failures, malfunctions, and corrective actions taken and the address of each such event.
2. The Company shall notify the Director of the Watershed Permitting Program at least 30 days in advance of the proposed transfer of ownership of the technology for which this Approval is issued. Said notification shall include the name and address of the proposed new owner and a written agreement between the existing and proposed new owner containing a specific date for transfer of ownership, responsibility, coverage and liability between them. All provisions of this Approval applicable to the Company shall be applicable to successors and assigns of the Company, unless the Department determines otherwise.
3. The Company shall develop and submit to the Department within 60 days of the effective date of this Approval: minimum installation requirements; an operating manual, including information on substances that should not be discharged to the System; a maintenance checklist; and a recommended schedule for maintenance of the System consistent with the Department's requirements essential to consistent successful performance of the installed Systems.
4. The Company shall develop and submit to the Department within 60 days, of the effective date of this Approval a standard protocol essential for consistent and accurate measurement of performance of installed Systems, including procedures for sample collection and analysis of the System. The protocol shall be in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater.
5. The Company shall make available, in print and electronic format, the referenced procedures and protocol in paragraphs 3 and 4 directly above to owners, operators, designers and installers of the System.
6. The Company shall institute and maintain a program of operator training and continuing education, as approved by the Department. The Company shall update the list of qualified operators on an annual basis and make the list known to users of the technology.

7. The Company or its designee shall conduct an intended use review of the System prior to the sale of any nonresidential unit to ensure that the proposed use of the System is consistent with the unit's capabilities.
8. The Company shall furnish the Department any information that the Department requests regarding the System within 21 days of the receipt of that request.
9. The Company shall include copies of this Approval and the procedures and protocol described in Section VI (3) and (4) with each System that is sold. In any contract executed by the Company for distribution or re-sale of the System, the Company shall require the distributor or re-seller to provide each purchaser of the System with copies of this Approval and the procedures and protocol described in Section VI (3) and (4).

VII. Reporting

1. All notices and documents required to be submitted to the Department by this Approval shall be submitted to:

Director
Watershed Permitting Program
Department of Environmental Protection
One Winter Street - 6th floor
Boston, Massachusetts 02108

VIII. Rights of the Department

1. The Department may suspend, modify or revoke this Certification for cause, including, but not limited to, non-compliance with the terms of this Approval, non-payment of the annual compliance assurance fee, for obtaining the Approval by misrepresentation or failure to disclose fully all relevant facts or any change in or discovery of conditions that would constitute grounds for discontinuance of the Approval, or as necessary for the protection of public health, safety, welfare or the environment, and as authorized by applicable law. The Department reserves its rights to take any enforcement action authorized by law with respect to this Approval and/or the System against the System owner, or operator and/or the Company.